3 The Effects of Marketing Mix Elements on Brand Equity*

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Abstract

The structural model of the effects of marketing mix elements on brand equity is defined in line with the existing theoretical findings. Research hypotheses are defined according to the identified structural model. In order to test the defined structural model and research hypotheses empirical research was conducted on the sample of undergraduate students of the Faculty of Economics and Business in Zagreb. Research results indicate that the structural model has an acceptable level of fit to the empirical data. The estimated structural coefficients and indirect effect coefficients indicate the direction and intensity of effects of each analysed element of marketing mix on brand equity. Finally, implications of research results for the theory and practice of brand management are analysed and discussed.

Keywords: brand equity, brand, strategic brand management, marketing mix
JEL classification: M31

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1 Introduction

The concept of brand equity was first introduced in marketing literature in the 1980's. During the 90's this topic received significant attention from both scientists and marketing practice, which resulted in a large number of articles and books on the subject (e.g. Aaker and Keller, 1990; Aaker, 1991; Keller and Aaker, 1992; Aaker and Biel, 1993; Keller, 1993; Aaker, 1996; Agarwal and Rao, 1996; Kapferer, 1998; Keller, 1998). The interest in brand equity is still active (e.g. Yoo et al., 2000; van Osselaer and Alba, 2000; Dillon et al., 2001; Keller, 2001; Yoo and Donthu, 2001; Moore et al., 2002).

The importance of brand equity consists in numerous benefits for companies that own brands. Brand equity has positive relationship with brand loyalty. More precisely, brand equity increases the probability of brand selection, leading to customer loyalty to a specific brand (Pitta and Katsanis, 1995). One of the benefits provided by high brand equity is the possibility of brand extension to other product categories. Generally, brand extension is defined as the use of an existing brand name for entry into a new product category (Aaker and Keller, 1990). When compared to new brand names, brand extensions have lower advertising costs and higher sales (Smith and Park, 1992). Successful brand extensions contribute to higher brand equity of the original brand (Dacin and Smith, 1994; Keller and Aaker, 1992), however, unsuccessful extensions may reduce the brand equity of the parent brand (Aaker, 1993; Loken and John, 1993). Aaker and Keller (1990) developed a model for consumer evaluation of brand extensions, and a number of authors worked on generalization of this model (Barrett et al., 1999; Bottomley and Doyle, 1996; Sunde and Brodie, 1993).

In addition, brand equity increases (1) willingness of consumers to pay premium prices, (2) possibility of brand licensing, (3) efficiency of marketing communication, (4) willingness of stores to collaborate and provide support, (5) elasticity of consumers to price reductions, and (6) inelasticity of consumers to prices increases, and reduces the company vulnerability to marketing activities of the competition and their vulnerability to crises (Barwise, 1993; Farquhar et al., 1991; Keller, 1993; Keller, 1998; Pitta and Katsanis, 1995; Simon and Sullivan, 1993; Smith and Park, 1992; Yoo et al., 2000). In general, we can say that brand equity represents a source of sustainable competitive advantage (Bharadwaj et al.,

1993; Hoffman, 2000). Also, literature identifies an impact of brand equity on the stock market reactions (Lane and Jacobson, 1995; Simon and Sullivan, 1993).

Currently, there are a large number of different definitions of brand equity, which may lead to conceptual misunderstandings when researching this phenomenon. An attempt to classify the different approaches to the definition of brand equity (Feldwick, 1996) could be useful in clarifying different approaches to and relationships involved in the complex concept of brand equity. Feldwick (1996) has identified three different approaches to brand equity: (1) brand value (the total value of the brand as a company's intangible asset – financial approach), (2) brand strength (the strength of consumer commitment to a particular brand – behavioristic approach) and (3) brand description (associations and beliefs consumers have about particular brands – cognitive approach). Brand strength and brand description are customer-based aspects of brand equity, whereas brand value is a financial aspect of brand equity.

This paper will adopt a behavioristic approach to brand equity, and brand equity will be taken to mean the difference in consumer choice between a branded and an unbranded product given the same level of product features (Yoo et al., 2000).

Despite the fact that brand equity attracts attention of both marketing scientists and marketing practitioners, the way in which, and how intensively, individual marketing mix elements affect the creation of brand equity has remained unstudied, with the exception of a paper by Yoo et al. (2000). Given the importance that brand equity has for companies operating under contemporary conditions, it seems fully justified to explore how and with what intensity individual marketing mix elements impact brand equity, with individual brand equity dimensions used as mediator variables. Such findings may serve as guidance to managers on the Croatian market as to how they can build and maintain the brand equity of Croatian brand names, and certainly represent a scientific contribution to a better understanding of the mechanisms, ways and intensity of influence of individual marketing mix elements on brand equity.

The objective of the present paper is to explore how marketing mix elements affect brand equity. Based on literature review and analysis of findings so far, Part 2 of the paper defines a structural model of impact of marketing mix elements on

brand equity. Part 3 and Part 4 deal with the survey conducted with the aim to test the defined structural model. Part 5 brings a summary of conclusions.

2 Structural Model of Impact of Marketing Mix Elements on Brand Equity

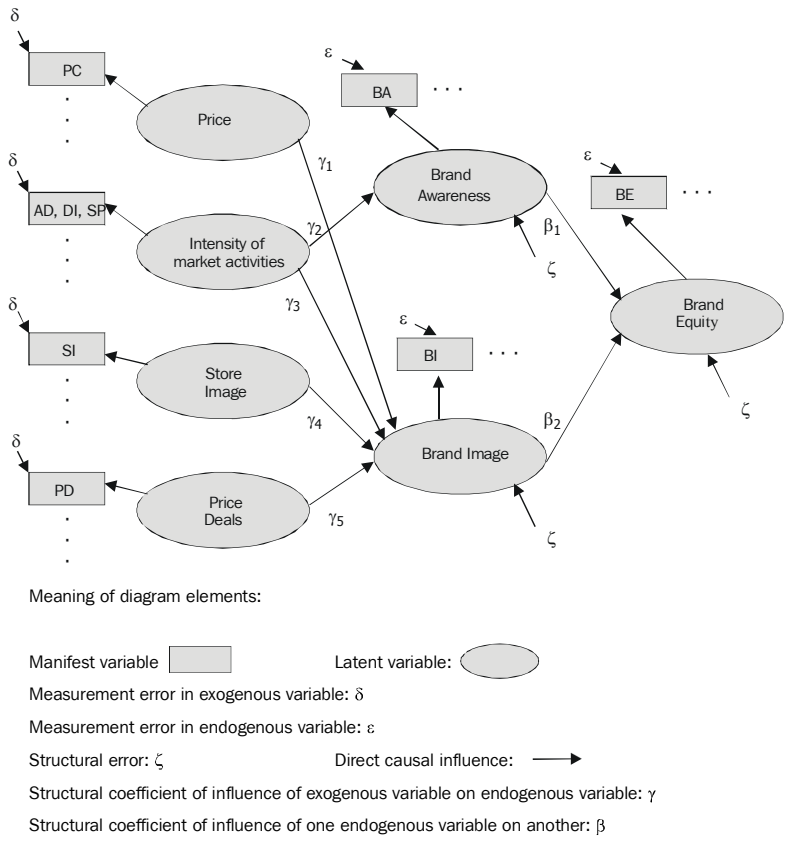
The structural model of impact of marketing mix elements on brand equity will consist of a set of exogenous variables (those variables whose causes are not represented in the model) and a set of endogenous variables (those variables whose causes are specified in the model). Exogenous variables will include all of the analysed marketing mix variables: (1) price level, (2) store image, (3) distribution intensity, (4) advertising, (5) price deals, and (6) sponsorships. It should be pointed out here that a preliminary statistical analysis of collected data, using an exploratory factor analysis, has shown that variables: distribution intensity, advertising, and sponsorships represent a single factor that can be tentatively called "intensity of marketing activities". In the structural model, distribution intensity, advertising, and sponsorships will hence be viewed as one exogenous variable. The results of exploratory factor analysis will be presented in more detail in Part 4.

Endogenous variables will be the different brand equity dimensions and brand equity itself. Variables that will be observed as brand equity dimensions will include: (1) brand awareness and (2) brand image. Brand equity dimensions will be viewed as mediator variables in the model. Mediator variables are those endogenous variables that cause some other endogenous variables (in this case brand equity).

All variables will be viewed as latent variables, whereas individual items from the measurement scales measuring specific latent variables will be viewed as manifest variables.

Figure 1 shows a diagram of the structural model of impact of marketing mix elements on brand equity. The model diagram was made using the standard elements applied in the structural equation modelling method (Kline, 1998).

Figure 1. **Structural Model of Impact of Marketing Mix Elements on Brand Equity**



The above structural model has been defined on the basis of theoretical and empirical findings and the exploratory factor analysis of data collected in a survey (the survey will be presented in more details in the following chapters).

Based on the illustrated structural model, the following hypotheses on the relationships between marketing mix elements and brand equity dimensions can be defined:

H1 – the higher the brand price, the more positive the brand image (parameter γ_1);

H2 – the higher the intensity of marketing activities, the greater the brand awareness (parameter γ_2);

H3 – the higher the intensity of marketing activities, the more positive the brand image (parameter γ_3);

H4 – the more positive the image of stores in which the brand is sold, the more positive the brand image (parameter γ_4);

H5 – the more frequent the price deals, the more negative the brand image (parameter γ_5).

Also, the following hypotheses can be defined on the relationships between brand equity dimensions and brand equity itself:

H6 – the higher the brand awareness, the greater the brand equity (parameter β_1);

H7 – the more positive the brand image, the greater the brand equity (parameter β_2).

Additionally, based on defined hypotheses, the following hypotheses on the relationships between marketing mix elements and brand equity can be defined:

H8 – the higher the brand price, the greater the brand market value (parameter α_1);

H9 – the higher the intensity of marketing activities, the greater the brand equity (parameter α_2);

H10 – the more positive the image of stores in which the brand is sold, the greater the brand equity (parameter α_3);

H11 – the more frequent the price deals, the lower the brand equity (parameter α_4).

Hypotheses H1–H7 will be tested by evaluating parameters γ_1-γ_5, and β_1 and β_2.

Hypotheses H8 - H11 will be tested by applying the analysis of indirect influence of a given marketing mix element on brand equity. The direction and intensity of influence of each marketing mix element will be calculated on the basis of all

causal influences between marketing mix elements and brand equity. For instance, the influence of the intensity of marketing activities on brand equity (parameter α_2) will be calculated as follows: *intensity of influence of the intensity of marketing activities on brand awareness x intensity of influence of brand awareness on brand equity + intensity of influence of the intensity of marketing activities on brand image x intensity of influence of brand image on brand equity* (Kline, 1998). Or, using the symbols of each parameter:

$$\alpha_2 = \gamma_2 \times \beta_1 + \gamma_3 \times \beta_2$$

3 Research Methodology

3.1 Measurement Instrument

The exogenous and endogenous variables of the defined structural model have been measured using measurement scales that contained items with which respondents expressed their agreement/disagreement. For expressing respondents' agreement/disagreement with the items, the five-point Linkert scale was used.

Shown below are exogenous and endogenous variables with the corresponding items. It should be stressed here that this is an initial set of items that will be additionally filtered through reliability and validity assessment methods.

Price:

- The price of this brand is high (pc1).
- This brand is expensive (pc2).
- The price of this brand is low (r)[1] (pc3).

Store Image:

- The stores in which I can buy this brand sell well-known brands (si1).
- This brand can be bought only in high-quality stores (si2).
- The stores in which I can buy this brand carry products of high quality (si3).

[1] *" r" denotes negative items that will be recoded before analysis.*

Distribution Intensity:

- Compared to competing brands, this brand is stocked in more stores (di1).
- The number of stores selling this brand is higher than the number of stores selling competing brands (di2).
- This brand is distributed through the largest possible number of stores (di3).

Advertising:

- Advertising campaigns for this brand are frequent (ad1).
- This brand is intensively advertised (ad2).
- Advertising campaigns for this brand are more expensive than advertising campaigns for competing brands (ad3).

Price Deals:

- This brand is frequently promoted through price deals (pd1).
- This brand can often be bought at promotional prices (pd2).
- Frequent price deals are offered for this brand (pd3).

Sponsorships:

- This brand seems to invest more in sponsorship of various events than competing brands (sp1).
- This brand frequently sponsors various events (sp2).
- Compared to competing brands, this brand sponsors various events more frequently (sp3).
- I often notice this brand as a sponsor of various events (sp4).
- Compared to competing brands, I notice this brand more often as a sponsor of various events (sp5).

Brand Awareness:

- This brand is very well known to me (ba1).
- I know this brand very well (ba2).
- This brand is not known to me (r) (ba3).
- I am acquainted with this brand (ba4).

Brand Image:

- This brand completely satisfies my needs (bi1).
- The characteristics of this brand completely satisfy my needs (bi2).
- This brand is best able to satisfy my needs (bi3).

Brand Equity:

- It makes sense to buy this brand instead of some other brand even if these two brands are the same (be1).
- If another brand is not different from this brand in any way, it would still seem smarter to buy this brand (be2).
- Even if another brand had the same characteristics as this brand, I would rather buy this brand (be3).
- If there was another brand of the same quality as this brand, I would rather buy this brand (be4).

3.2 Surveyed Brands

The survey covered three categories of products (non-alcoholic carbonated beverages, chocolate and entertainment electronics) from which 10 brand names were selected (Coca-Cola, Cockta, Pepsi, Fanta, Dorina, Milka, Toblerone, Philips, Samsung and Sony).

The selection of individual product categories and associated brands is conditioned by the structure of the survey sample (students). Therefore, in order to select individual product categories, 10 in-depth interviews were conducted among the students of the Zagreb Faculty of Economics and Business. During the interviews, the students were asked to name the products they currently use or have used or bought for themselves or others. Based on the results of in-depth interviews the above product categories were selected.

Also, during the final selection of product categories attention was paid to differences in products based on various criteria (e.g. price, frequency of purchase, duration of use, situations of use, risk) so as to increase the possibility for generalization of survey results through inclusion of different categories.

With the same goal in mind, in selecting individual brands we also tried to include varied brands that differ according to different criteria (e.g. price, quality, market share, country of origin).

3.3 Survey Sample

The survey was conducted among a sample of 2nd, 3rd, and 4th year undergraduate students of the Faculty of Economics and Business in Zagreb, in May and June 2003. The survey included a sample of 424 respondents.

The sample size issue is essential when applying the structural equation modelling method. When using this method, two criteria need to be met in defining the sample size (Kline, 1998):

1. Structural equation modelling is a large-sample method. As a general rule, those samples are considered large that contain more than 200 sample units.
2. In structural equation modelling, it is not enough to just select a large sample (N > 200), but in selecting the sample size the complexity of the structural model must be taken into consideration; the recommended ratio between the number of units in the sample and the number of parameters in the model is at least 10:1; if this ratio is less than 5:1, the results cannot be considered statistically stable nor can the parameter assessment and test statistics be considered valid.

In determining the sample for this survey both criteria were met. The sample belongs to the group of large samples (N > 200) and the ratio between the number of units and model parameters is larger than 10:1 (the ratio is 11:1).

3.4 Data Analysis

The collected data have been analysed using different statistical methods. The data analysis process in this survey was conducted in three stages: (1) assessment of psychometric characteristics of applied measurement scales; (2) preparation and

checking of data for application of the structural equation modelling method; and (3) data analysis using the structural equation modelling method. Throughout the entire data analysis process no consideration was made of which brands the respondents expressed their opinions on in order to increase the possibility for generalization of obtained results. Statistical data analysis was entirely conducted using the programme package Statistica 6.0.

The methods used for assessing the reliability and convergent and discriminant validity of the applied measurement instruments were Cronbach's alpha coefficient and exploratory factor analysis.

For the purposes of preparation and data checking for application of the structural equation modelling method the following analyses were made (Kline, 1998):

1. Data were checked for the existence of univariate outliers – outliers were identified with the value of individual manifest variables outside the range of ± 3 standard deviation from the respective mean;
2. Data were checked for the existence of multivariate outliers by calculating Mahalanobis distances in relevant multiple regressions (three multiple regression analyses were conducted – 1. brand image as a dependent variable, brand price, intensity of marketing activities, store image, and price deals as independent variables, 2. brand awareness as a dependent variable, marketing activities as an independent variable, 3. brand equity as a dependent variable, brand awareness and brand image as independent variables); squared Mahalanobis distances are interpreted as hi-square statistics, with the number of variables viewed as the level of freedom; it is recommended to use a conservative significance level ($p<0,001$); a multivariate outlier is a case in which the value of squared Mahalanobis distance is greater than the critical hi-square distribution value (with the corresponding level of freedom);
3. Univariate normality of distribution of manifest variables was tested by checking their kurtosis and skewness, whereby the kurtosis index and skewness index were calculated for each manifest variable, with the aim to identify manifest variables with leptokurtic or platykurtic distributions, and those with positively or negatively skewed distributions; absolute skewness index values lower than 3 and absolute

kurtosis index values lower than 10 are considered acceptable for application of the structural equation modelling method;

4. Multivariate normality was tested by calculating two multivariate normality indicators: (1) *Mardia-based kappa* indicator, and (2) relative multivariate kurtosis indicator; for data possessing the multivariate normality characteristic, the *Mardia-based kappa* indicator must have a value around 0, while the indicator of relative multivariate kurtosis must have a value of around 1;
5. Bivariate multicollinearity among manifest variables was tested using correlation analysis; absolute values of correlation coefficients higher than 0.85 indicate a bivariate multicollinearity;
6. Multivariate multicollinearity was tested through multiple regression of each individual manifest variable with other manifest variables; coefficients of multiple determination higher than 0.9 indicate multivariate multicollinearity;
7. Levene's homogeneity of variances test was used to test homoscedasticity of relationships among variables for which a direct causal link is assumed in the structural model; if Levene's test is non-significant, the hypothesis of homoscedasticity is not rejected.

In order to test the defined structural models of the effect of marketing mix elements on brand equity, the collected data were analysed using the structural equation modelling method. The general aim of the structural equation modelling method is to determine causal aspects of analysed correlations. This method was used to analyse the covariance matrix of analysed manifest variables.

4 Survey Results

4.1 Assessment of Psychometric Characteristics of Applied Measurement Scales

The reliability of used measurement scales was tested using Cronbach's alpha coefficient, while convergent and discriminant validity of measurement instruments was tested using exploratory factor analyses.

Table 1 shows the results of reliability testing of measurement scales used for measuring exogenous and endogenous variables of the defined structural model.

Table 1. **Cronbach's Alpha Coefficient for the Used Measurement Scales**

Variable	Cronbach Alpha
Price	0.87
Store Image	0.71
Distribution Intensity	0.75
Advertising	0.83
Price Deals	0.83
Sponsorships	0.90
Brand Awareness	0.65
Brand Image	0.85
Brand Equity	0.85

Cronbach's alpha coefficients lead us to the conclusion that the applied measurement scales exhibit satisfactory levels of reliability, ranging from acceptable to excellent. The measurement scale for measuring brand awareness has the lowest reliability level, while the highest level of reliability is exhibited by the measurement scale for intensity of sponsorships.

Also, the impact of specific items on Cronbach's alpha coefficient of the respective measurement scale was analysed in order to eliminate from further analysis those items that result in the reduction of the reliability of respective measurement scales. Based on such analyses, the following items were eliminated from further analysis.

Price:

pc3 – The price of this brand is low (r).

Distribution Intensity:

di3 – This brand is distributed through the largest possible number of stores.

Advertising:

ad3 - Advertising campaigns for this brand are more expensive than advertising campaigns for competing brands.

Sponsorships:

sp1 - This brand seems to invest more in sponsorship of various events than competing brands.

Brand Equity:

be1 - It makes sense to buy this brand instead of some other brand even if these two brands are the same.

The remaining items were subjected to an exploratory factor analysis in order to test convergent and discriminant validity of measurement scales. Table 2 shows the resulting factor structure with varimax factor rotation.

Table 2. **Factor Structure after Varimax Factor Rotation**

	Factor						
	1	**2**	**3**	**4**	**5**	**6**	**7**
bi1	0.06	**0.74**	-0.19	0.19	0.12	0.27	0.14
bi2	0.03	**0.84**	-0.11	0.05	0.08	0.21	0.09
pd1	0.12	-0.07	**0.78**	0.09	0.01	0.05	-0.17
ba1	0.10	0.18	0.24	-0.13	**0.64**	0.00	0.23
ad1	**0.75**	0.12	0.28	-0.08	0.15	-0.00	0.12
bi3	0.17	**0.73**	-0.00	0.06	0.14	0.38	-0.02
si1	-0.09	0.10	0.19	**0.77**	0.18	-0.02	-0.00
ba2	0.03	0.18	0.23	-0.17	**0.72**	0.13	0.12
di1	**0.65**	-0.28	-0.05	0.05	0.09	0.34	0.12
ba3	0.05	-0.01	-0.18	0.21	**0.72**	0.10	-0.13
be2	0.07	0.19	-0.02	0.10	0.01	**0.82**	0.06
pc1	0.10	0.07	-0.16	0.10	0.09	0.04	**0.89**
si2	0.08	0.08	-0.17	**0.69**	-0.17	0.19	0.33
pc2	0.13	0.07	-0.13	0.07	0.06	-0.05	**0.91**
di2	**0.66**	-0.26	-0.09	0.12	0.09	0.27	0.11
ad2	**0.75**	0.03	0.29	-0.08	0.23	0.01	0.14
pd2	0.29	-0.19	**0.72**	0.09	-0.02	0.10	-0.12
sp2	**0.85**	0.13	0.14	0.00	0.12	-0.09	0.05
sp3	**0.80**	0.23	0.11	-0.06	-0.06	-0.04	-0.06
si3	0.04	0.06	0.13	**0.84**	-0.10	0.13	-0.01
sp4	**0.88**	0.09	0.19	0.05	0.00	0.04	-0.00
ba4	0.22	0.02	-0.25	0.02	**0.60**	0.05	0.02
be3	0.10	0.21	0.10	0.09	0.10	**0.85**	0.01
be4	0.05	0.27	0.07	0.05	0.13	**0.79**	-0.09
sp5	**0.83**	0.02	0.06	0.03	0.01	0.13	0.02
pd3	0.31	-0.02	**0.82**	0.05	-0.02	-0.01	-0.06

pc - price; di -distribution intensity; si - store image; ad - advertising; pd - price deals; sp - sponsorships; ba- brand awareness; bi -brand image; be -brand equity.

Seven factors were selected, with the Kaiser-Guttman rule used as the criterion for selection of the number of factors. The seven factors explain 71.02 per cent of total variance.

The results of the factor analysis indicate that measurement scales used for measuring price, store image, price deals, brand awareness, brand image, and brand equity exhibit features of convergent validity (the respective items have high factor loading on the given factors) and discriminant validity (respective items have low factor loadings on other factors).

Measurement scales for measuring distribution intensity, advertising, and sponsorships do not mutually exhibit a discriminant validity feature. Namely, based on the factor structure we can conclude that these three measurement scales are measuring the same variable, which can tentatively be called intensity of marketing activities, and represent parts of a single measurement scale that measures such a variable. If these three measurement scales are viewed like this, then we can say that the measurement scale for measuring intensity of marketing activities exhibits features of convergent and discriminant validity. In the further analysis, the variables of distribution intensity, advertising and sponsorship will not be viewed as separate variables, but as a single variable to be called "intensity of marketing activities".

4.2 Data Preparation and Checking

Five univariate outliers were identified with values of individual manifest variables outside the range of 3 ± standard deviation from the respective mean. All five outliers were excluded from further analysis.

Also, two multivariate outliers were identified both of which were excluded from further analysis.

A total of seven outliers were excluded from further analysis. After exclusion of outliers, the sample for further analysis is N = 417.

To test the univariate normality of distributions of individual manifest variables, kurtosis index and skewness index were computed for each manifest variable. The resulting indices are shown in Table 3.

From the results we can infer that both indices are within acceptability limits (absolute values lower than 10 for kurtosis index, and absolute values lower than 3 for skewness index), and that collected data demonstrate an acceptable level of univariate normality.

Table 3. **Kurtosis Index and Skewness Index**

	Kurtosis Index	Skewness Index
bi1	-0.153	-0.218
bi2	-0.003	-0.262
pd1	-0.169	0.223
ba1	1.016	-0.608
ad1	-0.280	-0.645
bi3	0.049	0.075
si1	-0.583	-0.313
ba2	0.081	-0.332
di1	-0.644	-0.027
ba3	1.257	-1.113
be2	-0.647	0.038
pc1	-0.440	0.294
si2	-0.404	0.364
pc2	-0.481	0.246
di2	0.272	0.249
o2	-0.945	-0.197
pd2	0.027	0.129
sp2	-0.357	0.162
sp3	-0.208	0.238
si3	-0.198	-0.214
sp4	-0.512	-0.120
ba4	0.283	0.004
be3	-0.731	-0.029
be4	-0.597	-0.261
sp5	-0.618	0.170
pd3	-0.247	0.112

Multivariate normality was tested by calculating the *Mardia-based kappa* indicator and the relative multivariate kurtosis indicator. *Mardia-based kappa* has a value of 0.053, and relative multivariate kurtosis indicator a value of 1.053. Both results indicate that the data have an acceptable level of multivariate normality (*Mardia-based kappa* indicator has a value of around 0, and the relative multivariate kurtosis indicator a value of around 1).

Bivariate multicollinearity among manifest variables has been tested using correlation analysis. The results of correlation analysis lead to the conclusion that there is no unacceptable level of bivariate multicollinearity among manifest variables because absolute values of all correlation coefficients are lower than 0.85.

Table 4. **Coefficients of Multiple Determination**

Dependent Variable	Coefficient of Multiple Determination	Significance Level (p)
bi1	0.66	0.00
bi2	0.65	0.00
pd1	0.52	0.00
ba1	0.47	0.00
ad1	0.72	0.00
bi3	0.62	0.00
si1	0.41	0.00
ba2	0.51	0.00
di1	0.58	0.00
ba3	0.34	0.00
be2	0.58	0.00
pc1	0.77	0.00
si2	0.53	0.00
pc2	0.78	0.00
di2	0.59	0.00
ad2	0.74	0.00
pd2	0.72	0.00
sp2	0.75	0.00
sp3	0.64	0.00
si3	0.55	0.00
sp4	0.81	0.00
ba4	0.41	0.00
be3	0.71	0.00
be4	0.66	0.00
sp5	0.66	0.00
pd3	0.69	0.00

Multivariate multicollinearity has been tested using multiple regression of each individual manifest variable with the remaining manifest variables. Table 4 shows the resulting coefficients of multiple determination.

The table above shows that none of the multiple determination coefficients exceeds a value of 0.9, which leads to the conclusion that there is no unacceptable level of multivariate multicollinearity in collected data.

Homoscedasticity of individual relationships between variables for which a direct causal link is assumed in the structural model has been tested using Levene's test for homogeneity of variances. Individual variables were calculated as mean values of respondents' replies to specific items. Non-significance of Levene's test indicates that the hypotheses of homoscedasticity cannot be rejected, i.e. that the relationship between the tested variables is homoscedastic. Table 5 shows the significance of Levene's test for specific variable pairs.

Table 5. **Significance of Levene's Test for Homogeneity of Variances**

Variable Pairs	**Significance of Levene's Test (p)**
price – brand image	0.18
intensity of marketing activities – brand image	0.08
store image – brand image	0.07
price deals – brand image	0.13
intensity of marketing activities – brand awareness	0.52
brand image – brand equity	0.09
brand awareness – brand equity	0.23

Levene's test is non-significant for all tested variable pairs, which indicates that the hypothesis on homoscedasticity of specific relationships is not to be rejected, i.e. that the relationships between tested variables are homoscedastic.

All analyses conducted in the course of preparing and testing the collected data indicate that the collected data meet all the basic preconditions for application of the structural equation modelling method. Namely, (1) univariate and multivariate outliers have been excluded from further analysis, (2) data shows a satisfactory level of univariate and multivariate normality, (3) data shows no unacceptable level of

bivariate and multivariate multicollinearity, and (4) data shows a satisfactory level of homoscedasticity.

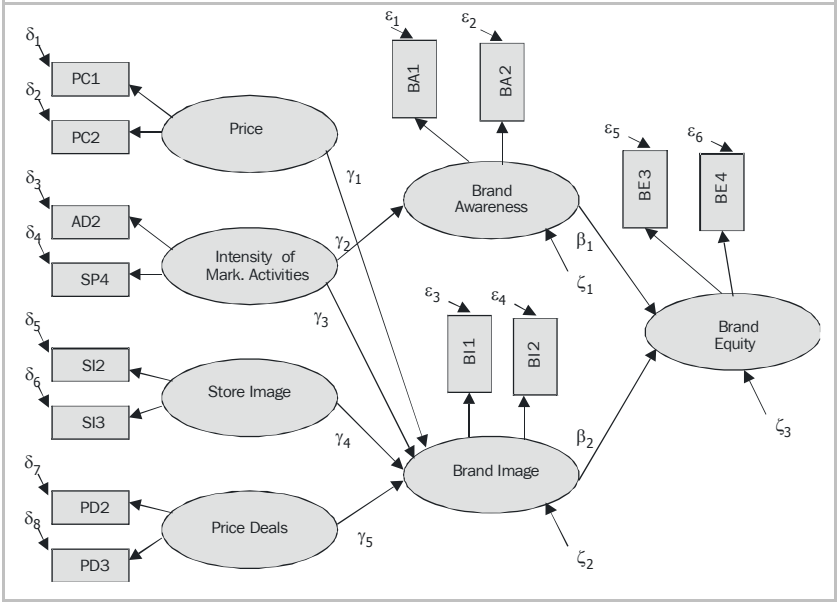
4.3 Data Analysis Using Structural Equation Modelling Method

In order to test the structural model of impact of marketing mix elements on brand equity, as defined in Part 2 of this paper, the collected data were analysed using the structural equation modelling method.

Since the relationship between sample size and number of parameters in the structural model is one of the factors in successful implementation of the structural equation modelling method, we first proceeded to define the possible number of parameters in the model in relation to sample size (N=417). The ratio between the number of units in the sample and the number of parameters in the model should be at least 10:1. In this survey, the target for this ratio was set at 11:1 so as to exceed the recommended minimum threshold. The set target presupposes a structural model with a maximum number of 38 parameters (417/11=37.91). Since the model consists of seven latent variables, and also having in mind measurement errors and disturbance parameters, it follows that each latent variable could be assigned to maximum two manifest variables (this produces 14 parameters assessing the connection between manifest and latent variables, 7 parameters assessing the causal link among latent variables, 14 parameters assessing the measurement error in specific manifest variables, and 3 parameters assessing structural errors – a part of variance of endogenous variables not explained by exogenous variables, making a total of 38 parameters). For each latent variable those manifest variables were selected that have the highest correlation to the total value of the respective measurement scale as a whole.

Figure 2 shows the above described structural model that was tested in this survey.

Figure 2. **Structural Model of Impact of Marketing Mix Elements on Brand Equity**



The next step is to determine whether the defined structural model can be identified. In hybrid models (the defined model belongs to the group of hybrid models), there are three criteria for model identification:

1. The number of parameters must be lower or equal to the number of unique fields in the covariance matrix; the number of unique fields in the covariance matrix is computed according to the following formula: v*(v+1)/2, where v is the number of manifest variables; the defined model has 14 manifest variables, and the number of unique fields in the covariance matrix is equal to 105 (v*(v+1)/2 = 14*15/2 = 210/2 = 105); given that the defined model has 38 parameters, we may conclude that the first criterion for model identification is met (38 < 105);
2. The latent factors must have their own metric; this criterion will be met by fixing the variance of all latent variables to the value of 1;
3. If the model contains only one latent variable, at least 3 manifest variables must be included; if the model contains two or more latent

variables, to each latent variable at least two manifest variables must be assigned; as the defined model contains more than two latent variables, and each has two manifest variables attached to it, we conclude that this model identification criterion is met too.

Since all three model identification criteria have been satisfied, we may conclude that the defined model can be identified.

After having established this, we proceeded to analyse the data by structural equations modelling. This method was used to analyse the covariance matrix of analysed manifest variables.

Following the analysis using structural equation modelling, we first sought to determine the level of fit between the defined model and the analysed data. Table 6 shows the indices measuring the level of fit of the model to the analysed data.

Table 6. **Fit Indices**

Index	**Index Value**
Goodness-of-Fit Index (GFI)	0.877
Adjusted Goodness-of-Fit Index (AGFI)	0.815
Normed Fit Index (NFI)	0.831
Non-Normed Fit Index (NNFI)	0.808
Comparative Fit Index (CFI)	0.853

The values of analysed indices indicate that the level of fit of defined model to data is satisfactory and that the defined model is acceptable for further analysis (Hu and Bentler, 1999).

The next step in application of the structural equation modelling method is the analysis of the structural model itself aimed at testing the set of hypotheses. Table 7 shows standardized structural coefficients that evaluate direct causal links among latent variables, specified in the defined structural model (Figure 2).

Table 7. **Standardized Structural Coefficients**		
Hypothesis	**Parameter**	**Standardized Structural Coefficients**
H1: price → brand image (+)	γ_1	0.16*
H2: intensity of marketing activities → brand awareness (+)	γ_2	0.45*
H3: intensity of marketing activities → brand image (+)	γ_3	0.10**
H4: store image → brand image (+)	γ_4	0.28*
H5: price deals → brand image (-)	γ_5	-0.20*
H6: brand awareness → brand equity (+)	β_1	0.23*
H7: brand image → brand equity (+)	β_2	0.45*

** standardized structural coefficients are statistically significant at a level $p<0.001$.*
*** standardized structural coefficients are statistically significant at a level $p<0.05$.*

The resulting standardized structural coefficients indicate that hypotheses H1 through H7 can be considered confirmed. All structural coefficients are statistically significant and have the expected direction.

Accordingly, the following relationships apply:

- the higher the brand price, the more positive the brand image,
- the higher the intensity of marketing activities, the higher the brand awareness,
- the higher the intensity of marketing activities, the more positive the brand image,
- the more positive the image of stores in which the brand is sold, the more positive the brand image,
- the more frequent the price deals, the more negative the brand image,
- the higher the brand awareness, the higher the brand equity,
- the more positive the brand image, the higher the brand equity.

After having identified and analysed the direct causal impacts in the analysed structural model, we may proceed to identify and analyse the indirect causal impacts of marketing mix elements on brand equity. This will allow us to test the hypotheses H8 through H11.

Indicators of indirect causal impacts have been computed by multiplying respective structural coefficients, which are placed between an individual marketing mix element and brand equity. If there is more than one direction of indirect impact of an individual marketing mix element on brand equity, then individual products of multiplication are added up. As this is the case only with the intensity of marketing activities, the indicator of indirect impact of this marketing mix element on brand equity is calculated according to the following formula:

$$\alpha_2 = \gamma_2 \times \beta_1 + \gamma_3 \times \beta_2$$

Table 8 shows the calculated indicators of indirect impacts with corresponding significance evaluation.

Table 8. **Indicators of Indirect Causal Impact**

Hypothesis	Parameter	Indicator of Indirect Impact
H8: price → brand equity (+)	α_1	0.07*
H9: intensity of marketing activities → brand equity (+)	α_2	0.15*
H10: store image → brand equity (+)	α_3	0.12*
H11: price deals → brand equity (-)	α_4	-0.09*

** indicators of indirect impact are statistically significant at a level p<0,05.*

The resulting indicators of indirect causal impact indicate that hypotheses H8 through H11 may be considered confirmed. All structural coefficients are statistical significant, and have the expected direction.

Accordingly, the following relationships apply:

- the higher the brand price, the higher the brand equity,
- the higher the intensity of marketing activities, the higher the brand equity,
- the more positive the image of stores in which the brand is sold, the higher the brand equity,
- the more frequent the price deals, the lower the brand equity.

5 Conclusion

The research results indicate that different marketing mix elements impact the creation of brand equity with different levels of intensity, as well as that some elements of marketing mix can negatively affect the creation of brand equity.

This conclusion has several important implications for strategic brand management. First, the obtained research results point out very clearly to the importance of a strategic approach for brand management, with creation of brand equity, and not just brand sales, being a criterion for deciding on the application of specific marketing mix elements. If the focus of brand management is placed exclusively on sales, it may easily happen that those marketing activities are chosen (e.g. price reduction activities) which are likely to increase sales in the short run, but may deteriorate the brand equity in the long run.

The research results also implicate that when allocating marketing budgets to individual marketing mix elements attention must necessarily be paid to the potential impact of a specific marketing mix element on the creation of brand equity. This further means that the potential impact of individual marketing mix elements on brand equity must be included as criterion in deciding on the allocation of marketing budgets to individual marketing mix elements.

The research results point out to the need for careful selection of individual marketing mix elements in order to avoid deterioration of the achieved brand equity. This additionally emphasizes the importance of a strategic approach to brand management as a means of avoiding that fulfilment of certain short-term goals (e.g. short-term increase in sales) disrupts the possibility for long-term sales growth and achievement of sustainable competitive advantages, undoubtedly resulting from high brand equity.

Furthermore, the research results indicate that managers, in their efforts to build the equity of the brands they are managing, should primarily focus on the creation of brand awareness and a positive brand image. In the tested model, the said two variables have been viewed as mediator variables that are affected by managers through marketing mix elements, and these two variables have a direct impact on brand equity. All activities aimed at positively impacting the brand equity should

be focused either on increasing the brand awareness or on improving the brand image, or both.

The research results lead us to the conclusion that managers who are engaged in strategic brand management may use the price level as an instrument for improving the brand image. Namely, as supported by theoretical findings, this research has shown that a higher brand price communicates a better brand image, and through a more positive brand image indirectly leads to an increase in brand equity. Furthermore, a particularly interesting finding is that managers may contribute to an increase in brand equity through the very intensity of marketing activities. Namely, the intensity of marketing activities, without considering their quality, positively affects the creation of brand awareness and building of a more positive brand image, which in turn results in an increased brand equity. Presenting especially important implication for the practice of strategic brand management is the fact that the image of stores in which a brand is sold has the strongest positive impact on brand image, and through this variable also on brand equity. This result underlines the importance of the brand manager's active approach in selecting and designing the distribution channels. In doing this, special heed should be paid to the effect of the selected stores on brand image, as well as that, when selecting the distribution channel members, the image of the potential channel members and the potential impact of their image on brand image, and thus the brand equity, is included as a criterion in the decision-making process. The research results indicate that brand managers should be very careful when applying price deals as a marketing mix element. Even though price deals may lead to certain short-term financial gains resulting from a short-term sales increase, in the long run a frequent use of this marketing mix element may cause a reduction in brand equity because of the negative influence of price deals on brand image, and thus may eliminate the short-term benefits that may arise from the use of this method.

The research findings underline the importance of a long-term approach to brand management. Companies using brand sales as the only indicator of the successfulness of brand management may be in danger of reducing the equity of their brands.

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